



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,422	12/03/2001	Osamu Nozawa	Q67546	5963

7590

06/19/2003

SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, DC 20037-3213

EXAMINER

ROSASCO, STEPHEN D

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 06/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/998,422

Applicant(s)

NOZAWA, OSAMU

Examiner

Stephen Rosasco

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/03/01 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Detailed Action

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yabe et al. (5,834,142) in view of Hashimoto et al. (5,721,075)

The claimed invention is directed to a lithography mask blank, a mask made from the blank and a method of manufacturing a mask blank on a transparent substrate, comprising the steps of: depositing, on the transparent substrate, at least one light absorption film which has a property of absorbing a laser of a predetermined wavelength;

and irradiating a laser beam of the predetermined wavelength onto the light absorption film to heat the light absorption film and to thereby alleviate its internal stress.

And wherein the mask blank is a phase shift mask blank while the light absorption film is formed by a translucent film which serves as a phase shift film of the phase shift mask blank so as to attenuate exposure light of predetermined intensity.

Yabe et al. teach a method of manufacturing an X-ray mask comprising the steps of: forming an X-ray absorber on a substrate; and

annealing the X-ray absorber by heating the X-ray absorber in accordance with a specified non-uniform temperature distribution based on a measured thin film stress distribution throughout the X-ray absorber to make the thin film stress throughout the X-ray absorber substantially zero.

And wherein, before said annealing step, a preliminary annealing step is carried out in such a way that the X-ray absorber is uniformly heated before final annealing and the final annealing is performed in accordance with a specified temperature distribution based on a thin film stress distribution measured just before the final annealing throughout the X-ray absorber to make the thin film stress substantially zero.

And wherein said heating means is a laser output device positioned above the X-ray absorber.

The teachings of Yabe et al. differ from those of the applicant in that the applicant teaches the method for use with a phase shifting mask blank.

Hashimoto et al. teach a method of fabricating halftone phase shift photomask blank having a halftone phase shift layer on a substrate deemed to have 100% transmittance, the transmittance of said halftone phase shift layer being variable within the range of 1% to 50%, inclusive, said method comprising: forming a material for said phase shift layer such that its transmittance with respect to exposure light has a specific value forming said phase shift photomask blank using the formed material; and

changing the transmittance of the material for the halftone phase shift layer to a desired transmittance value.

Hashimoto et al. also teach a method of fabricating a halftone phase shift photomask blank having a halftone phase shift layer on a substrate deemed to have 100% transmittance, the transmittance of said halftone phase shift layer being variable within the range of 1% to 50%, inclusive, said method comprising: forming a material for said phase shift layer such that its transmittance with respect to exposure light has a specific value forming said phase shift photomask blank using the formed material; and

changing the transmittance of the material for the halftone phase shift layer to a desired transmittance value.

And that since the amount of change in the exposure light transmittance varies depending on heating temperature, heating time, heating atmosphere, etc., it is possible to control the exposure light transmittance by controlling these factors. For this high-temperature treatment use may be made of every heating means including baking furnaces, ovens, and hot plates.

It would have been obvious to one having ordinary skill in the art to take the teachings of Yabe et al. and combine them with the teachings of Hashimoto et al. in order to make the claimed invention because phase shift masks have similar problems to x-ray masks as far as stress buildup in the fabrication of the mask layers, and are made of similar materials and it would be obvious to use a technique that proves beneficial in one area for the other mask.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Rosasco whose telephone number is (703) 308-4402.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661. Fax (703) 872-9310 Before Finals; 872-9311 After Finals.

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, elongated initial 'S'.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
6/16/03